CLAIMS

1. A method of displaying a representation of a physiological signal produced by an organ of interest of the patient, the method comprising the acts of:
obtaining a portion of at least one physiological signal acquired from the patient;
determining an area to display;
constructing a virtual image including (M) polygonal areas;
transforming the obtained signal to a plurality of values;
assigning each value to one of the (M) polygonal areas;
assigning a visual characteristic to each polygonal area based in part on the assigned values; and
displaying at least a portion of the virtual image including the assigned visual characteristics.

2. A method as set forth in claim 1 wherein the act of obtaining a portion of at least one physiological signal includes the acts of placing at least one electrode on the patient and obtaining at least a portion of a multi-lead electrical signal acquired from the electrode.

3. A method as set forth in claim 1 wherein the act of obtaining one physiological signal includes the act of obtaining at least a portion of a multi-lead electrocardiogram (ECG) acquired from the patient's exterior.

4. A method as set forth in claim 3 wherein the multi-lead ECG is a twelve lead ECG.

5. A method as set forth in claim 4 wherein the obtained portion of the representative signal is one data point for each lead.

6. A method as set forth in claim 4 wherein the obtained portion of the representative signal is a plurality of data points representing a portion of the cardiac cycle.

7. A method as set forth in claim 6 wherein the obtained portion of the representative signal is the ST-wave of the cardiac cycle.

8. A method as set forth in claim 1 wherein the act of obtaining at least a portion of the representative signal includes the acts of attaching a sensor to the patient and sensing the physiological signal with the sensor to obtain the representative signal.

9. A method as set forth in claim 8 wherein the sensor includes a plurality of electrodes.

10. A method as set forth in claim 1 wherein the act of obtaining at least a portion of the representative signal includes the act of reading the representative signal from a memory device.

11. A method as set forth in claim 1 wherein the virtual image represents at least a portion of the body surface of the patient.

12. A method as set forth in claim 1 wherein each polygonal area has a size and a shape, and wherein the sizes and shapes are equivalent areas.

13. A method as set forth in claim 1 wherein each polygonal area is a four-sided polygon.

14. A method as set forth in claim 1 wherein the act of constructing a virtual image includes the acts of determining the portion of the patient to be represented, creating a multidimensional image representing the portion of the patient to be represented, determining the value of (M), and dividing the representative surface area into (M) polygonal areas.

15. A method as set forth in claim 1 wherein the act of assigning a visual characteristic to each polygonal area includes assigning a color to each polygonal area, based at least in part on the corresponding assigned value.

16. A method as set forth in claim 1 wherein the act of assigning a visual characteristic to each polygonal area includes assigning a character to each polygonal area, based at least in part on the corresponding assigned value.

17. A method as set forth in claim 5 wherein the act of transforming the obtained signals includes transforming the data points of the twelve leads to (M) values, and wherein the act of assigning each value to one of the (M) polygonal areas result in each polygonal area having one of the (M) values.

18. A method as set forth in claim 1 wherein (M) is equal to one hundred ninety-two.

19. A method of displaying a representation of an electrocardiogram (ECG), the method comprising the acts of:
obtaining at least a portion of a multi-lead ECG acquired from the patient's exterior;
determining an area to display;
constructing a virtual image including (M) polygonal areas;
transforming the obtain portion of the multi-lead ECG to (M) values;
assigning each value to one of the (M) polygonal areas, the assigning act resulting in each polygonal area having one of the (M) values;
assigning a visual characteristic to each polygonal area based in part on the assigned values; and
displaying at least a portion of the virtual image including the assigned visual characteristics.

20. A method as set forth in claim 19 wherein the number of obtained leads is twelve leads.

21. A method as set forth in claim 20 wherein (M) is equal to one hundred ninety-two.

22. A method as set forth in claim 19 wherein the obtained portion of the ECG is one data point for each lead.

23. A method as set forth in claim 19 wherein the obtained portion of the ECG is a plurality of data points for each lead representing a portion of the cardiac cycle.

24. A method as set forth in claim 19 wherein the act of obtaining at least a portion of a multi-lead ECG includes the acts of attaching a sensor to the patient's exterior, sensing the ECG with the sensor, and creating the multi-lead ECG.

25. A method as set forth in claim 24 wherein the sensor includes a plurality of electrodes.

26. A method as set forth in claim 19 wherein the act of obtaining at least a portion of a multi-lead ECG includes the acts of reading at least a portion of the multi-lead ECG from a memory device.

27. A method as set forth in claim 19 wherein the virtual image is a three-dimensional surface area representing at least a portion of the patient.

28. A method as set forth in claim 19 wherein the (M) polygonal areas are regions on the three-dimensional surface area, wherein the (M) polygonal areas do not overlap, and wherein each polygonal area includes the same amount of area.

29. A method as set forth in claim 28 wherein each polygonal area is a four-sided polygon.

30. A method as set forth in claim 19 wherein the act of constructing a virtual image includes the acts of determining the portion of the patient to be represented, creating a multidimensional surface area representing the portion of the patient, determining the value of (M), and dividing the representative surface area into (M) polygonal areas.

31. A method as set forth in claim 19 wherein the act of assigning a visual characteristic to each polygonal area includes assigning a color to each polygonal area based at least in part on the corresponding assigned value.

32. A method of analyzing a physiological signal produced by a patient and generate an optimal set of signals for particular diagnosis, the method comprising the acts of:

obtaining (N) voltages from a signal representing the physiological signal;

converting the (N) voltages to (M) values, where (M) is greater than (N);

optimizing the (M) values to (P) values, where (P) is less than (M).

33. A method as set forth in claim 32 and further comprising classifying the physiological signal with the (P) optimized values.

34. A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a pattern recognition model for obtaining a classification output.

35. A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a neural network for obtaining a classification output.

36. A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a fuzzy algorithm for obtaining a classification output.

37. A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a Bayesian decision logic for obtaining a classification output.

38. A method as set forth in claim 32 wherein the signal representing the physiological signal is an (N) multi-lead electrocardiogram.

39. A method as set forth in claim 38 wherein (N) is equal to twelve, (M) is equal to one hundred ninety-two, and (P) is equal to twelve.

40. A method as set forth in claim 32 wherein, prior to the act of optimizing the (M) values to (P) values, the method further comprises:
repeating the act of obtaining (N) voltages (C) times, the repeating act resulting in (C) sets of (N) voltages;
repeating the act of converting the (N) voltages to (M) values for each set of (N) voltages, the repeating act resulting in (C) sets of (M) values;
condensing the (C) sets of (M) values to one set of (M) values.

41. A method as set forth in claim 40 wherein the physiological signal is electrical signals that are generated by the patient's heart in a cardiac cycle, and wherein the (C) sets of (N) voltages are an (N) multi-lead representation of a portion of the cardiac cycle.

42. A method as set forth in claim 32 wherein the act of obtaining the (N) voltages includes the acts of attaching a sensor to the patient's exterior, sensing the physiological signal with the sensor to obtain (N) analog physiological signals, and sampling each signal to produce the (N) voltages.

43. A method as set forth in claim 42 wherein the sensor includes a plurality of electrodes.

44. A method as set forth in claim 32 wherein the act of obtaining (N) voltages includes the act of reading the (N) voltages from a memory device.

45. A method as set forth in claim 40 wherein the (C) sets of (M) values result in (M) signals having (C) data points, and wherein the act of condensing the (C) sets of (M) values includes the act of integrating the (M) values over the (C) data points.

46. A method as set forth in claim 32 wherein the act of optimizing the (M) values to (P) values includes the acts of obtaining a database of previously recorded comparison values, computing a covariance matrix, and applying principal component analysis to the covariance matrix.